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PRINCIPAL INVESTIGATOR: Babek Kateb

CONTRACTING ORGANIZATION: International Brain Mapping & Intraoperative Surgical Planning Society
West Hollywood, CA 90046

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Email: Bkateb@IBMISPS.org

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International Brain Mapping & Intraoperative Surgical Planning Society
West Hollywood, CA 90046

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14. ABSTRACT

The third annual meeting of International Brain Mapping & Intra-operative Surgical Planning Society (IBMISPS) was held In Clermont Ferrand, France (Sep 5-8, 2006). The Society is organized for the purpose of encouraging leading basic and clinical scientists who are interested or active in areas of Brain Mapping (BM) and intra-operative Surgical planning (ISP) to share their findings with other physicians and scientists across the disciplines. Currently, there is no combined conference on both subjects. This meeting intends to build a bridge between the two fields. The meeting has been organized by the board of directors and who will form the organizing committees: Search, Medical Education Committee, Program and Finance in collaboration with the local organizing committee who are listed on the program. The event did have significant clinical and basic science components. Thus, it was a multidisciplinary venue to explore and clarify a defined subject, problem, or area of knowledge related to BM and ISP with leaders in the field. The 4th annual meeting of IBMISPS is set for Sep. 6-8, 2007 in Washington DC. IBMISPS is also intended for the purpose of promoting the public welfare through the advancement of Intraoperative Surgical Planning and Brain Mapping, by a commitment to excellence in education, and by dedication to research and scientific discovery. The mission of the association will be achieved through a multi-disciplinary collaboration of government agencies, patient advocacy groups, educational institutes and private sector (industry) brought together in order to address issues and problems related to BM and ISP and implement new technologies to benefit patient care. We had specific scientific sessions on ranging from Image Guided Surgery, OR and Hospital of the future to nanomedicine & stem cell imaging ;All talks and abstracts that are presented at the meeting will be published on line and selected ones will be published in IBMISPS-NeuroImage.www.Elsevier.com

15. SUBJECT TERMS
Brain mapping, Cellular Imaging, Neuro-Navigation, Neurosurgery, Nanomedicine, or & Hospital of the Future, Informatics, endoscopy, Biophotonics, Robitcs, Brain injury, PTSD, spine

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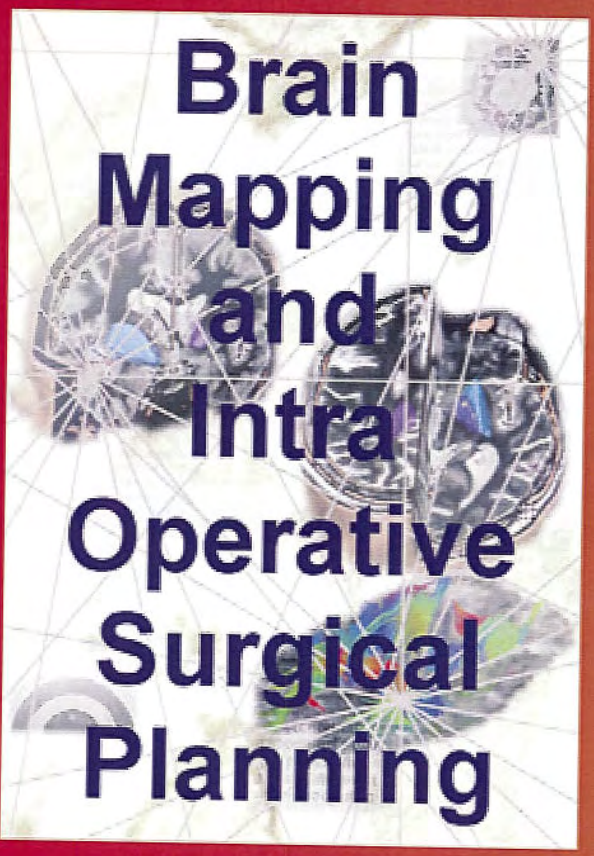
Brain Mapping and Intra Operative Surgical Planning



CDP, Clermont-Ferrand, France

September 5-8, 2006

3rd Annual Congress of the IBMISPS

Scientific committee:

President: Ferenc JOLESZ (2005-2006), Warren GRUNDFEST (2006-2007);

Behnam BADIE; Elaine BEARER; Elizabeth BULLIT; Zang-Hee CHO; Vittorio CRISTINI; V Reggie EGERTON; Stephan ERBERICH; Karl FRISTON; Peter GRUEN; Henry HIRSCHBERG; Babak KATEB; Jean-Jacques LEMAIRE; Adam MAMELAK; Farzad MASSOUDI; Shouleh NIKZAD; Chi ZEE

Local committee—2005 Congress:

Barra V (Computer Science); Boire JY (Biostatistics); Bonnard-Gougeon M (Neuroanesthesiology); Bonny JM (MR technologies); Boyer L (Radiology); Chazal J (Neurosurgery); Durif F (Neurology); Gabrillargues J (Neuroradiology); Irthum B (Neurosurgery); Lemaire JJ (Neurosurgery); Martinet P (Robotics); Maublant J (Nuclear Medecine); Michel JL (Radiology); Quilliot A (Computer Science); Ray P (Mechanics); Renou JP (MR technologies); Richetin M (Computer Vision); Schoeffler P (Anesthesiology); Vanelle P (Radiotherapy)

International Brain Mapping & Intra operative Surgical Planning Society (IBMISPS)

Board of Directors

Contents

International Brain Mapping & Intra operative Surgical Planning Society (IBMISPS)

President's Letter

I am pleased to welcome members of our society, scientists, physicians, and members of industry, academia and government to the third annual meeting of IBMISPS. We hold this meeting in Clermont-Ferrand France to expand our international ties and build a broadly based collaborative society focused on brain mapping and therapy.

Our society brings together a diverse scientific and engineering community to discuss topics related to brain imaging and brain mapping for improved diagnosis and treatment of brain diseases. To make progress in these areas, interdisciplinary efforts are critical for success. Colleagues from neurology, neurosurgery, rehabilitation medicine, imaging, electrophysiology, neuroscience, biomedical informatics, biophysics, proteomics, molecular biology and neural prosthetics all have a significant role to play in the development of new diagnostic and therapeutic modalities.

Once we have developed new scientific methods, we must rely on industry and government to assist in the translation of these ideas into practical technologies. The goal of our symposium is to enhance communication between subspecialty physicians, scientists and clinicians in general. We wish to involve industry and government so that a better understanding of these topics may lead to enhanced support for our activities. Our educational mission reaches out not only to the scientific community but to the public as well. We believe that public education is the key to public understanding of healthcare needs for those with brain diseases, and public support is essential for continued progress in these efforts.

Warren S. Grundfest
President IBMISPS
Professor Bioengineering Electrical Engineering and Surgery UCLA
Senior Scientist
TATRC, US Army Medical Research and Materiel Command

International Brain Mapping & Intra operative Surgical Planning Society (IBMISPS)

Founder's Letter

It is an honor to welcome you to the 2006 IBMISPS annual World Congress in the beautiful city of Clermont-Ferrand in France. This year's world Congress meeting may not possible without Professor Jean Jacques Lemaire's outstanding organizational skills and commanding coordination. Also I should congratulate the local organizing committee many of them who are distinguished faculty of university of Auvergne and the honorable members of board of directors of the foundation and Society for their hard and diligent work on this Congress.

I proudly announce that Professor Lemaire has successfully established the European chapter of IBMISPS, which will be one of the most active chapters of the society in the world. This chapter is organized for the purpose of encouraging basic and clinical scientists in Europe who are interested or active in areas of Brain Mapping (BM) and intra-operative Surgical planning (ISP) to share their findings with other physicians and scientists across the disciplines.

The European chapter, which is headquartered in Clermont-Ferrand will be working very closely with the IBMISPS board of directors and its world headquarter in Los Angeles, California, to promote the public welfare through the advancement of ISP and BM, by a commitment to excellence in education, dedication to research and scientific discovery.

The IBMISPS board of directors intends to achieve its goals by facilitating multi-disciplinary collaborations among government agencies, patient advocacy groups, educational institutes and private sector (industry). We believe that through this approach we can address issues and problems related to BM and ISP and implement new technologies to benefit patient care.

Formation of IBMISPS European headquarter under the leadership of Professor Lemaire and with support of brilliant scientist, physicians, surgeons and students like yourself (as its members) will undoubtedly contribute to the quality of science and patient care in the Europe and aboard.

Therefore, on behalf of the board of directors, I welcome you to our society and its annual meetings.

Sincerely and respectfully yours,

Babak Kateb
Director of Research & Development
Department of Neurosurgery
City of Hope National Comprehensive Cancer Center
Founder and Executive Director of IBMISPS

International Brain Mapping & Intra operative Surgical Planning Society (IBMISPS)

Dear Colleagues, Fellows, Friends,

On behalf of the Board of Directors of IBMISPS I would like to announce the annual meeting of the International Brain Mapping and Intra operative Surgical Planning Society (IBMISPS). The Symposium scheduled to be held in Clermont-Ferrand, France, in September 5-8, 2006.

The aim of our non-profit organization is to facilitate the interface between basic and medical scientists, as well as between scientists and public and industry. The thematic focused on brain mapping, in its wide meaning, and its many spin-offs in technological, biological and clinical domains. The IBMISP society promotes this active interface participating in the development of new therapeutic modalities for diseases of the nervous system. If today the invasive techniques are in the core of the topic, the future is clearly to move in the non-invasive direction. There are many challenges in this wide field, which is covered by various specialties from the basic research to clinical applications. Due to constant and important technological, biological and medical progresses, we give the opportunity for people of different horizons to share ideas and results through a non conventional scientific meeting.

To accept the scientific and the medical challenges, we have to transcend our daily practices toward a trans disciplinary approach, one of the key for the future in this highly sophisticated field of research. In this way, societies from civil domain, politicians, and insurance companies are also solicited to debate. At last we also encourage students to attend the Symposium, as the education is one of the main ways to spread and to stimulate the debates and the progresses.

The Auvergne University, the Auvergne Region and the city of Clermont-Ferrand are happy to welcome you for this meeting, organized under the auspices of the IBMISPS and held for the first time in Europe. We thank the scientific societies, the official governmental partners and the industrial partners, who have accepted to sponsor the meeting and encourage you to visit our website for more detail: www.IBMISPS.Org

We look forward to seeing you in France.
Sincerely yours,

Jean-Jacques Lemaire, MD, PhD
Member of Board of Directors
Director of IBMISPS European Headquarters
Co-chair of 2006 IBMISPS Annual Meeting

Address:
8159 Santa Monica Blvd. Suite 200
West Hollywood, CA 90046
P.O. Box 7056, Los Angeles, CA 90007
Telephone: (310) 500-6196 Fax: (323) 654-3511
www.IBMISPS.Org

International Brain Mapping & Intra operative Surgical Planning Society (IBMISPS)

Program

TUESDAY 5

8.00 AM — *Late registration – Badges*

9.45 AM — *Introduction - Welcome - Officials*

10.30 - 11.30 AM WHITE MATTER ANALYSIS

Chairman: Boespflug-Tanguy O - Co-Chairman : Hermoye L

10.30 AM DTI Atlas in Children and Adults
Hermoye L (Imagilys Ltd & Catholic University of Louvain, Brussels, Belgium)

10.50 AM Degenerative White Matter Diseases and Imaging
Boespflug-Tanguy O (Auvergne University, Clermont-Ferrand, France)

11.10 AM Diffusion Tensor MR Imaging of the Spinal Cord
Tsuchiya K (Kyorin University School of Medicine, Tokyo, Japan)

11.30 AM — *Intersession*

11.35 -12.20 AM NEW IMAGES-TECHNOLOGIES - 1

Chairman : Grundfest W - Co-Chairman : Nikazad S

11.35 AM Trans-blood Vision Imaging
Grundfest W (UCLA, Los Angeles USA)

11.55 AM Imaging the Brain with Space Technology
Nikazad S (NASA-Jet Propulsion Laboratory, Caltech, Pasadena USA)

12.15 AM — *Pause*

12.20 AM — *LUNCH BREAK*

1.20 PM — *Pause*

1.35 - 2.30 PM CLINICAL NEUROIMAGING - 1

Chairman : Gruetter R - Co-Chairman : Nguyen JP, Segebarth C

1.35 PM MRI Analysis of the Human Brain Metabolism
Gruetter R (University of Lausanne and Geneva;Ecole Polytechnique, Switzerland)

1.55 PM Recent Advances in MR Neuroimaging
Segebarth C (Joseph Fourier University, Grenoble France)

2.15 PM In vivo and ex vivo Basal Ganglia Metabolism in Rat Models of Parkinson's Disease
Durif F (Auvergne University, Clermont-Ferrand - France)

2.30 PM — *Intersession*

2.35 - 3.35 PM CLINICAL NEUROIMAGING - 2

2.35 PM Pathophysiology of Neuropathic Pain: contribution of fMRI
Bouhassira D (Hôpital Ambroise Paré, Paris France)

2.55 PM Functional Imaging of Pain and Analgesia: from Phenomenology to Mechanisms
Garcia-Larrea L (Hôpital Neurologique, Lyon France)

3.15 PM Cortex Stimulation
Nguyen JP (University Hospital of Créteil, Paris France)

3.35 PM — *Intersession*

3.40 - 4.00 PM RELATED: NEUROPATHOLOGY

3.40 PM Neuroimaging for the Neuropathologist
Duyckaerts C (Groupe Pitié Salpetrière, Paris, France)

4.00 PM — *COFFEE/TEA BREAK*

4.15 - 4.55 PM NEW IMAGES-TECHNOLOGIES - 2

(Visio conference)

4.15 PM MEG: Applications and Future
Mamelak A (Cedars Sinai Medical Center, Los Angeles USA)

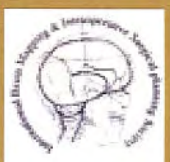
4.35 AM Nano and Micro Systems for Space and Medical Applications
Manhora H (NASA-Jet Propulsion Laboratory, Caltech, Pasadena USA)

4.55 PM — *END OF SESSIONS*

5.00 PM — *Transfer*

5.30 PM — *Free*

6.00 - 8.30 PM — *BOARD MEETING*



WEDNESDAY 6

8.30 - 10.30 AM BRAIN INTERFACE

Chairman : Kateb B - Co-Chairman : Goldman M

8.30 AM **Deep Brain Stimulation: Future Trends**
Benabid AL (Joseph Fourier University, Grenoble France)

8.50 AM **Neural Prosthesis for Brain Dysfunction**
Berger T (Department of Biomedical Engineering, USC, Los Angeles USA)

9.10 AM **Human Brain Machine Interfaces**
Goldman M (Providence, Rhodes Island USA)

9.30 AM **Brain Interface: Examples of Micro and Nano Technologies**
Campagnolo R (Leti-CEA, Grenoble France)

9.50 AM **Human Brain Machine Interface, Problems and Solutions**
Kateb B (City of Hope National Comprehensive Cancer Center, Duarte USA)

10.10 AM **Automated Spatio-Temporal Classification of Human Minds for Brain Computer Interface**
Lee JH (Harvard Medical School, Boston USA)

10.30 AM Intersession

10.35 - 11.15 AM NON INVASIVE LESIONNAL TECHNOLOGIES

Chairman : De Salles A - Co-Chairman : Verrelle P

10.35 AM **Mapping in Radiosurgery**
De Salles A (UCLA, Los Angeles USA)

10.55 AM **Radiosurgery with Proton Beams**
Schulte R (Loma Linda USA)

11.15 AM COFFEE/TEA BREAK

11.25 - 12.45 AM NEUROMATHEMATICS

Chairman : Lemieux L - Co-Chairman : Boire JY

11.25 AM **Knowledge Representation and Modelization of Brain Structures**
Bloch I (ENST, Paris France)

11.45 AM **Image Post-processing and Brain Imaging**
Boire JY (Auvergne University, Clermont-Ferrand France)

12.05 AM **Spatial Normalisation of Lesioned Brains**
Crinion J (University College, London UK)

12.25 AM **Coupling EEG-fMRI**
Lemieux L (University of London, London UK)

12.45 AM Pause

12.50 AM LUNCH BREAK

1.35 PM Pause

1.40 - 3.00 PM CELL IMAGING

Chairman : Bearer EL - Co-Chairman : Shapiro E

1.40 PM **In Vivo Axonal Transport**
Bearer El (Brown University, Providence USA)

2.00 PM **MR Imaging of US(M)PIO-labeled Cells using Inner Volume 3-D FSE Sequence**
Yoo SS (Harvard Medical School, Boston USA)

2.20 PM **MRI-guided Cell Therapy**
Bulte J (Johns Hopkins, Baltimore USA)

2:40 PM **Stem Cell Imaging**
Shapiro E (Yale University School of Medicine New Haven USA)

3.00 PM Intersession

3.05 - 4.35 PM SURGERY - 1

Chairman : Kikinis R - Co-Chairman : Soler L

3.05 PM **Simulation and Virtual Reality, toward Neurosciences Applications**
Soler L (IRCAD, Strasbourg France)

3.25 PM **Open Source Software for Image Guided Therapy**
Kikinis R (Harvard Medical School, Boston USA)

3.45 PM **Robotics in Image Guided Therapy**
Hata N (Harvard Medical School, Boston USA)

4.05 PM **Surgical Simulation, Virtual Neurosurgery**
Vloeberghs M (Nottingham University Hospital, Nottingham UK)

4.20 PM **Design of an Innovating Robotic System for Neurosurgery**
Alric M (Blaise Pascal University, Clermont-Ferrand France)

4.35 PM Intersession

4.40 - 5.00 PM RELATED: SCIENTIFIC DISCLOSURE

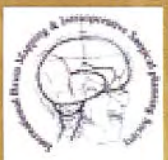
4.40 PM **Neuroscientifc Disclosure**
Potdevin T (Agence France Presse - AFP, Paris France)

5.00 PM END OF SESSIONS

5.05 PM Transfer

5.35 - 6.35 PM ROMAN ART TOUR IN THE CITY

7.15 - 8.30 PM CITY HOUSE RECEPTION



International Brain Mapping & Intra operative Surgical Planning Society (IBMISPS)

Program

THURSDAY 7

8.30 - 9.30 AM ENDOSCOPIC SURGERY

Chairman : Decq P - Co-Chairman : Szekely G

8.30 AM **Endoscopy and Hydrocepahlus: Lessons for the Future**
Decq P (Créteil, Paris France)

8.50 AM **Neuroendoscopy : Current Topics, Tools and Techniques**
Ishihara S (Saitama Medical University, Saitama Japan)

9.10 AM **Potential of Image and VR Guidance Techniques in Neuroendoscopic Surgery**
Szekely G (Swiss Federal Institute of Technology, Zurich Switzerland)

9.30 AM *Intersession*

9.35 - 10.35 AM SURGERY - 2

Chairman : Jolesz F - Co-Chairman : Cinquin P

9.35 AM **Future Trends in Neurosurgical OR**
Jolesz F (Harvard, Boston USA)

9.55 AM **Challenges in Computer Assisted Medical Interventions**
Cinquin P (TIMC-IMAG-CNRS, Grenoble France)

10.15 AM **Remote Controlled Surgical System**
Desgeorges M (Invalides, Paris France)

10.35 AM COFFEE/TEA BREAK

10.50 - 11.50 AM SURGERY - 3

Chairman : Deveaux B - Co-Chairman : Moreau JJ

10.50 AM **Brain Mapping in Epileptic Surgery**
Deveaux B (Hôpital Saint-Anne, Paris France)

11.10 AM **Brain Mapping in Stereotactic Surgery**
Lemaire JJ (Auvergne University, Clermont-Ferrand France)

11.30 AM **Models of Surgical Procedures in Computer Assisted Neurosurgery**
Jannin P (Medecine Faculty, Rennes France)

11.50 AM *Intersession*

11.55 - 12.15 AM RELATED: ETHICS

11.55 AM **Neuroethics**
Sicard D (President of French National Committee of Ethics, Paris France)

12.15 AM Pause

12.20 AM LUNCH BREAK

1.10 PM Pause

1.20 - 2.15 PM SURGERY - 4

Chairman : Massoudi F - Co-Chairman : Lemaire JJ

1.20 PM **Frameless Stereotaxy**
Massoudi F (UCLA, Los Angeles USA)

1.40 PM **Multi-modality Brain Mapping for Pre- and Intra-operative Image-guided Neurosurgery**
Golby AJ (Harvard Medical School, Boston USA)

2.00 PM **World First Hybrid Interventional Procedure Suite; MRI/X-ray/Operation Suite (MRXO)**
Matsumae M (Tokai University School of Medicine, Kanagawa Japan)

2.15 PM **Reconstruction of Cranio-facial Bone Defects Using Bioceramic Implants Manufactured by a Stereolithographic Process**
Brie J (Limoges University, Limoges France)

2.30 PM Intersession

2.35 - 4.10 PM TUMOR

Chairman : Menei Ph - Co-Chairman : Chazal J

2.35 PM **Intraoperative Biophotonics**
Akimoto J (Tokyo Medical University, Tokyo Japan)

2.55 PM **Fluorescence Based Resection of Gliomas**
Sabel M (University of Erlangen-Nürnberg, Erlangen Germany)

3.15 PM **Intraoperative Optical Imaging**
Prakash N (UCLA, Los Angeles USA)

3.35 PM **In Situ Chemotherapy for Gliomas: from Polymeric Devices to Nanotechnlogies**
Menei Ph (University Hospital, Angers France)

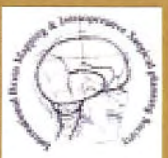
3.55 PM **Advanced MRI Techniques for Pre and Intra-Operative Evaluation of Brain Tumors**
Armin SS (Loma Linda University Medical Center, Loma Linda USA)

4.10 PM COFFEE/TEA BREAK

4.30 PM END OF SESSIONS

4.35 PM Transfer

6.15 PM DEPARTURE FOR THE GALA DINNER – CASTLE



FRIDAY 8

8.30 - 9.30 AM BIOMECHANICS/TRAUMA

Chairman : Terminassian A - Co-Chairman : Chambers I

8.30 AM **Intra Cranial Biomechanics**
Czosnika M (University of Cambridge, Cambridge UK)

8.50 AM **Non Invasive Assessment of Intracranial Biomechanics**
Ragauskas A (Kaunas University of Technology, Kaunas Lithunia)

9.10 AM **Imaging and Brain Trauma**
Terminassian A (University Hospital, Caen France)

9.30 AM COFFEE/TEA BREAK

9.50 - 11.20 AM HAND-ON WORKSHOP

Presentation of Workshop

Radiosurgical Planning
De Salles A (UCLA, Los Angeles USA)

Basal Ganglia Mapping
Lemaire JJ *(Auvergne University, Clermont-Ferrand France)*

Neuroendoscopy
Decq P *(Créteil, Paris France)*
Ishihara S *(Saitama Medical University, Saitama Japan)*

Telesurgery
Corporates

11.20 AM Intersession

11.30 - 12.10 AM VASCULAR

Chairman : Picard L - Co-Chairman : Irthum B

11.30 AM **Interventional Neuroradiology and/or Endovascular Neurosurgery? What about the Future?**
Picard L (University Hospital of Nancy, Nancy France)

11.50 PM **Near-infrared Angiography for Aneurysm Surgery**
Raabe A (Johann Wolfgang Goethe University, Frankfurt am Main Germany)

12.10 PM Pause

12.15 PM LUNCH BREAK

1.00 PM Pause

1.10 – 1.50 PM BIOMEDICAL INFORMATICS

Chairman : Erberich S - Co-Chairman : Boyer L

1.10 PM **Grid-based Network for Brain Mapping**
Erberich S (USC, Los Angeles USA)

1.30 PM **Collaborative Networks: the Fusion of Data, Standards and Guidelines for Improving Management**
Chambers I (New Castle UK)

1.50 PM Intersession

1.55 PM CLOSING REMARKS

2.10 PM END OF CONGRESS

2.15 PM TRANSFER/AIRPORT TRANSPORTATION

International Brain Mapping & Intra operative Surgical Planning Society (IBMISPS)

Access to Clermont-Ferrand

By car:

Paris : 350 kms, Highway (autoroute) A71
Montpellier : 300 kms, Highway (autoroute) A75
Bordeaux : 340 kms, Highway (autoroute) A89

By train from Gare de Lyon-Paris:

3h30 of travel

By plane:

Clermont-Ferrand/Auvergne international Airport
(8 flights/day Paris/Clermont-Ferrand)

AIR FRANCE

IBMISPS

Reference to be quoted: AXZE SE 6363 Validity from 09/02/06 to 09/11/06

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Check details with your Air France office.

* Charge for calls:0,12€/min

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Congress center

CDP (Centre Diocésain de Pastorale)
133 avenue de la République
63000 Clermont-Ferrand

Information and congress registration

Website: www.IBMISPS.org

Practical information, accommodation and special request

MO ORGANISATION

21 Rue de la Varenne
63122 CEYRAT - FRANCE
Tél : 33 (0)4 73 61 51 88
Fax : 33 (0)4 73 61 51 39
Email : contact@agence-mo.com

Welcome desk

OPEN on Tuesday 5th September from 8:00 AM to 5:00 PM, on Wednesday 6th from 8:00 AM to 5:30 PM, on Thursday 7th from 8:00 AM to 5:00 PM and on Friday 8th from 8:00 AM to 3:00 PM. Hostesses will help you with any information you may need during the whole congress.

Registration fees

TARGET	UNTIL MAY	UNTIL JULY	ON SITE
Regular	300 $	360 $	420 $
Student	240 $	300 $	420 $
Corporate	360 $	420 $	420 $
IBMISPS	240 $	300 $	420 $

Caution !
Payment on site will be charged in Euros according to the $ currency in September 2006.

Registration fees include: access to the scientific sessions, exhibition and lunches served in the exhibition on the ground floor of CDP, Roman Art Tour on Wednesday afternoon, and the City Hall Reception (casual).
Gala dinner is not included in the registration fees.

Social program

Wednesday: Roman Art Tour of the city of Clermont-Ferrand, followed by a City Hall Reception at 7.15 p.m.
Departure from the congress center at 5.05 p.m.

Gala dinner

Typical "castle" evening
will be held on Thursday September 7, 2006 .
The Saint Saturnin Castle will welcome you for an unforgettable evening.
Transportation provided.

Price: 50 €
Dress code: Formal
Departure: 6.15 p.m.

Accommodation – Registration until the 10th August 2006

To make a reservation please contact MO Organisation at contact@agence-mo.com

Hotels have been selected in different categories within a price range from 65 € to 130 € per room and per night. This service is available only to participants registered at the congress.

First night amount guarantees your registration.

RATES:

HOTELS	LOCATION	SINGLE	DOUBLE	BREAKFAST	TAXE
HOLIDAY INN***	Downtown	85 $	85 $	10 $	0,50 $
KYRIAD**	Downtown	55 $	60 $	6,50 $	0,50 $
REPUBLIQUE**	Downtown	59 $	63 $	8 $	0,50 $

Payment

Amount due in Dollar

- **By Credit Card:** VISA, American Express, and Eurocard / Mastercard are accepted (secured online registration).
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Cancellation policy:

All cancellation must be received in writing. All registration fees will be refunded for cancellations received **before August 10, 2006. After this date** there will be no refund.

Weather

For any information regarding the weather: www.meteofrance.com region Auvergne.

International Brain Mapping & Intra operative Surgical Planning Society (IBMISPS)

2006 Award recipients

EXCELLENCE IN RESEARCH, DEVELOPMENT AND CLINICAL FIELD CRYSTAL AWARDS

Warren GRUNDFEST
President of IBMISPS
UCLA, USA

Dr. Grundfest is currently Professor of Biomedical Engineering, Electrical Engineering, and Surgery at the University of California, Los Angeles. He received his MD degree from Columbia University, College of Physicians & Surgeons, in 1980 and trained in General Surgery at UCLA and Cedars-Sinai Medical Center. He was appointed Assistant Director of Surgery and Assistant Clinical Professor of Surgery at UCLA in 1987. In 1995 he was appointed as a Research Professor of Biomedical Engineering at University of Southern California and as Visiting Associate in Mechanical Engineering at California Institute of Technology (Caltech). Dr. Grundfest served as Director of the Cedars-Sinai Laser Research and Technology Development Program from 1989-2001, holding the Dorothy and E. Philip Lyon Chair in Laser Research. Dr. Grundfest served as Chair of the UCLA Biomedical Engineering Program from 1999-2002. Dr. Grundfest developed microendoscopy as a tool for the study of acute coronary ischemic syndromes, and pioneered the development of minimally invasive techniques for the treatment of cardiovascular disease. He has designed, built and tested multiple new lasers, optical diagnostic instruments, and minimally invasive surgical tools to reduce the need for invasive surgery. In 1994 he was inducted into the Space Technology Hall of Fame for his use of NASA laser technology for cardiovascular applications. In 1996 he was elected Fellow, American Institute of Medical & Biologic Engineers (AIMBE), for pioneering development and dissemination of minimally invasive surgery. In the same year he was elected Fellow, Society of Photo-Optical Instrumentation Engineers (SPIE), for his distinguished & valuable contributions to the field of optical engineering in medicine & biology. Dr. Grundfest is a past member of the Surgery and Bioengineering Study Section of the National Institutes of Health Center for Scientific Review; has chaired multiple review panels; and regularly consults for the NIH and FDA. He works closely with the UCLA CASIT (Center for Advanced Surgical and Interventional Technologies) Center in the development of haptic feedback systems, optical sensors, and robotic systems to improve the capabilities of minimally invasive surgery. Dr. Grundfest currently serves as a Senior Technology Advisor to TATRC (Telemedicine and Technology Research Center of the Army).

Alim Louis BENABID
Neurosurgeon, MD, PhD; Service of Neurosurgery, University Hospital of Grenoble,
Director of the program of stereotactic and functional neurosurgery, Head of the Laboratory of Pre Clinical Neurosciences - U318, Joseph Fourier University, INSERM
GRENOBLE, FRANCE

Dr. A.L. Benabid is Neurosurgeon, Professor of Biophysics and member of the Academy of Sciences. His non conventional training led him to develop pioneering clinical and pre clinical research works in neurosurgery from the first robotized surgical tool in stereotactic neurosurgery to the deep brain stimulation (DBS) technique. His extensive work in the field of functional neurosurgery is worldwide recognized and has given a strong impulse to the clinical practice as well as the research in this domain of neurosciences. From movement disorders to psychiatric diseases recently, he reopened surgical therapeutic options, with a non lesional approach, meanwhile the whole clinical applications beneficiated of the innovation, even imaging. His visionary research work linked with a deep respect of the clinical practice and a permanent quest of quality is an example for all, clinicians and researchers.

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International Brain Mapping & Intra operative Surgical Planning Society (IBMISPS)

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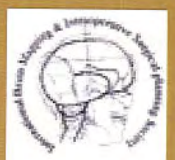

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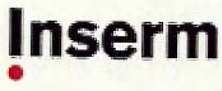

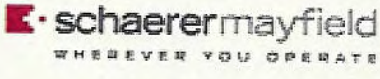

International Brain Mapping and Intra Operative Surgical Planning Society

3rd Annual Meeting
Clermont-Ferrand
France
September, 5-8, 2006

WWW.IBMISPS.org

International Brain Mapping & Intraoperative Surgical Planning Society (IBMISPS)

Proceeding of 2006 Annual meeting of International Brain Mapping and Intra-operative Surgical Planning Society (IBMISPS)

The Mission Statement for International Brain Mapping and Intra-operative Surgical Planning Society (IBMISPS):

IBMISPS is a non-profit association organized for the purpose of encouraging basic and clinical scientists who are interested or active in areas of Brain Mapping (BM) and Intra-operative Surgical Planning (ISP) to share their findings with other physicians and scientists across the disciplines (i.e. Neurosurgeons, radiologists, neurologists, biotechnologists, Engineers, anthropologists and neuroscientists).

This association is also intended for the purpose of promoting the public welfare through the advancement of Intra-operative Surgical Planning and Brain Mapping, by a commitment to excellence in education, and by dedication to research and scientific discovery. The mission of the association will be achieved through a multi-disciplinary collaboration of government agencies, patient advocacy groups, educational institutes and private sector (industry) brought together in order to address issues and problems related to BM and ISP and implement new technologies to benefit patient care.

Educational Objectives:

The event will provide participants with 27 hours of CME credit through Medical Educational Collaborative Corporation ; a nonprofit organization specialized for providing CME credit for medical conferences.

Up on Competition of the scientific meeting, participants should be able to :

- Identify new findings in brain mapping (BM) & Intraoperative Surgical Planning (ISP) most relevant to their own sub field (i.e. molecular imaging and or biophotonics)
- Describe the effect of the newly developed methods in BM and ISP
- Discuss and design the possible future research and developments in BM & ISP and assess the possible impact of such research and development on their own clinical and scientific work in the future
- Describe and assess the latest cutting-edge technological advancement in BM & ISP
- Explain ways to build a bridge between the two fields, BM & ISP
- Discuss and describe governmental agencies roles in research and development of BM & ISP

Specific program

Lectures, Scientific Exhibits (posters), Special focus sessions, , Basic science, Clinical trials, Governmental regulation, Patient family Advocacy and Cutting edge research and development in BM and ISP

Topics for Scientific papers

- General Issues
- Operational Issues
- Image guided systems

- Vascular & Blood flow imaging
- Intraoperative Surgical Planning & Image guided surgery
- BM and ISP in Stereotactic Radiosurgery
- Molecular and cellular imaging
- Anatomy
- Nanoscience, genomics, computational genetics in brain mapping
- 4D, Neuro-mathematics and bio-informatics
- Neurophysiology
- Functional brain mapping (fMRI, PET,…)
- Brain Mapping and Intra-operative Surgical Planning using Endoscopy
- Biophotonics
- Brain Mapping and Neural Prosthesis & Robotics
- Multi-modality imaging
- Perfusion imaging, micromagnetic resonance imaging,
- Magnetic resonance Spectroscopic Imaging
- High-field magnetic resonance, history of brain cartography
- Ethical issues related to the brain mapping and intra-operative surgical planning,
- Magnetoencephalographic
- Transcranial Magnetic Stimulation
- Diffusion Tensor Imaging
- SPECT functional Brain Mapping and
- histopathology in brain mapping
- Nanomedicine
- OR and Hospital of the Future

Chair and Co-Chair:
Mr Babak Kateb, Founder and Executive Director of the IBMISPS chaired the 2006 annual meeting. Meeting included more than 70 speakers from 35 countries. The congress covered all aspects of the brain mapping and image guided surgery and created an outstanding atmosphere for exchange of scientific data as well as formation of collaborative partnership among industry, faculties of educational institutions, patient advocacy groups and government agencies. Dr. Jean Jeaques Lemaire who is the Director of IBMISPS in Europe, member of the board of directors co-chaired the event.

The following are the names, titles, topics and talks/abstracts that were presented in the 2006 congress.

TUESDAY SEPTEMBER 5, 2006

8.00 AM Late registration – Badges
9.45 AM INTRODUCTION – WELCOME – OFFICIALS

10.30 – 11.30 AM WHITE MATTER ANALYSIS
Chairman: Boespflug-Tanguy O - Co-Chairman : Hermoye L

10.30 AM **DTI ATLAS IN CHILDREN AND ADULTS**
Hermoye L ***(Imagilys Ltd & Catholic University of Louvain, Brussels, Belgium)***

10.50 AM **DEGENERATIVE WHITE MATTER DISEASES AND IMAGING**
Boespflug-Tanguy O ***(Auvergne University, Clermont-Ferrand, France)***

11.10 AM **DIFFUSION TENSOR MR IMAGING OF THE SPINAL CORD**
Tsuchiya K ***(Kyorin University School of Medicine, Tokyo, Japan)***

11.30 AM *Intersession*

11.35 – 12.20 AM NEW IMAGES-TECHNOLOGIES –1
Chairman : Grundfest W - Co-Chairman : **Nikazad S**

11.35 AM **TRANS-BLOOD VISION IMAGING** Grundfest W *(UCLA, Los Angeles USA)*

11.55 AM **IMAGING THE BRAIN WITH SPACE TECHNOLOGY**
Nikzad S *(NASA-Jet Propulsion Laboratory, Caltech, Pasadena USA)*

High performance imagers and detectors in a wide range of the spectrum are used for understanding fundamental astrophysics, cosmology, and planetary studies. In particular, imaging and detection in ultraviolet, visible, and near infrared part of the spectrum is used to study vastly varying problems including life detection, dark energy studies, birth of stars and galaxies, planetary atmospheres, and alike. Because of NASA's exacting requirements on power and mass of payloads, a great deal of effort is spent on reducing the size, power, and complexity of systems with little or no cost to the performance. High performance detectors and imagers enable study of complex phenomena that might produce very faint signals.
We use epitaxial non-equilibrium techniques to manipulate atoms positions, alter bandstructure and interface structures, form quantum dots, and produce exceptional results. These techniques are applied to a variety of material systems such as silicon and gallium nitride for creating high performance UV to near IR imagers.
In medical applications, fluorescence and other signatures can be used to identify and delineate cells or study the functions in the human body. Similarly in these applications, signals are faint and the operational environment challenging. The synergy between these fields has instigated collaborative efforts to investigate the use the technology developed or is under development for NASA applications in medical fields such as brain mapping.
KEYWORDS: Nanotechnology, UV Imaging
PRESENTATION PREFERANCE: Oral Presentation (Invited)
SECTION PREFERANCE: New Images

12.15 AM *Pause*

12.20 AM LUNCH BREAK – DEJEUNER

1.20 PM *Pause*

1.35 – 2.30 PM CLINICAL NEUROIMAGING-1
Chairman : Gruetter R - Co-Chairman : Nguyen JP, Segebarth C

1.35 PM **MRI ANALYSIS OF THE HUMAN BRAIN METABOLISM**
Gruetter R *(University of Lausanne and Geneva;Ecole Polytechnique, Switzerland)*

1.55 PM **RECENT ADVANCES IN MR NEUROIMAGING**
Segebarth C *(Joseph Fourier University, Grenoble France)*

2.15 PM **IN VIVO AND EX VIVO BASAL GANGLIA METABOLISM IN RAT MODELS OF PARKINSON'S DISEASE**
Durif F *(Auvergne University, Clermont-Ferrand France)*

2.30 PM *Intersession*

2.35 – 3.35 PM CLINICAL NEUROIMAGING-2

2.35 PM **PATHOPHYSIOLOGY OF NEUROPATHIC PAIN: CONTRIBUTION OF FMRI**
Bouhassira D (*Hôpital* ***Ambroise Paré, Paris France)***

2.55 PM **FUNCTIONAL IMAGING OF PAIN AND ANALGESIA: FROM PHENOMENOLOGY TO MECHANISMS**
Garcia-Larrea L *(**Hôpital Neurologique, Lyon France)***

3.15 PM **CORTEX STIMULATION** Nguyen JP *(University Hospital of **Créteil, Paris France)***

3.35 PM *Intersession*

3.40 – 4.00 PM RELATED: NEUROPATHOLOGY

3.40 PM **NEUROIMAGING FOR THE NEUROPATHOLOGIST**
Duyckaerts C *(Groupe Pitié Salpetrière, Paris, France)*

4.00 PM COFFEE/TEA BREAK

4.15 – 4.55 PM NEW IMAGES-TECHNOLOGIES - (Visio conference)

4.15 PM **MEG: APPLICATIONS AND FUTURE** Mamelak A *(Cedars Sinai Medical Center, Los Angeles USA)*

4.35 AM **NANO AND MICRO SYSTEMS FOR SPACE AND MEDICAL APPLICATIONS**
Manhora H (NASA-Jet Propulsion Laboratory, Caltech, Pasadena USA)

4.55 PM END OF SESSIONS

5.00 PM *Transfer*

5.15 PM Free

5.40 – 8.10 PM BOARD MEETING

WEDNESDAY SEPTEMBER 6, 2006

8.30 – 10.30 AM BRAIN INTERFACE
Chairman : Kateb B - Co-Chairman : Goldman M

8.30 AM **DEEP BRAIN STIMULATION: FUTURE TRENDS**
Benabid AL *(Joseph Fourier University, Grenoble France)*

8.50 AM **NEURAL PROSTHESIS FOR BRAIN DYSFUNCTION**
Berger T *(Department of Biomedical Engineering, USC, Los Angeles USA)*

9.10 AM **HUMAN BRAIN MACHINE INTERFACES** Goldman M *(Providence, Rhodes Island USA)*

9.30 AM **BRAIN INTERFACE: EXAMPLES OF MICRO AND NANO TECHNOLOGIES**
Campagnolo R *(Leti-CEA, Grenoble France)*

9.50 AM **HUMAN BRAIN MACHINE INTERFACE, PROBLEMS AND SOLUTIONS**
Kateb B *(City of Hope National Comprehensive Cancer Center, Duarte USA)*

10.10 AM **AUTOMATED SPATIO-TEMPORAL CLASSIFICATION OF HUMAN MINDS FOR BRAIN COMPUTER INTERFACE** Lee JH *(Harvard Medical School, Boston USA)*

Jong-Hwan Lee[1], Heather M. O'Leary[1], Ugochukwu Amadi[3], Soo-Young Lee[2], Ferenc A. Jolesz[1] and Seung-Schik Yoo[1&2]
[1]Department of Radiology, Brigham and Women's Hospital, Harvard Medical School, Boston, MA, USA, [2]Department of BioSystems, Korea Advanced Institute of Science and Technology, Daejeon, Korea, [3]Gachon Medical School, Incheon, Korea

Automated interpretation/classification of neuroimaging data is an emerging research field that enables the characterization of underlying thought processes with minimal human intervention. It is the crucial technical element in the implementation of fMRI-based Brain Computer Interface (BCI) [Weiskopf et al.(2003), Yoo et al.(2004)], where the localized brain activation pattern is translated to generate computer or hardware commands. Recently, several researches have been conducted in the area of fMRI pattern classification [Cox and Savoy (2003), Yoo et al. (2004), Martinez-Ramon et al. (2006)]. These studies, however, has been based on the block-based task design which tends to lengthen data acquisition time. In this work, we present a method for automated classification of human thoughts reflected on an event-related paradigm, with significantly shortened data acquisition time (less than a minute). Based on our preliminary experience on various cognitive imagery tasks, six distinct thoughts (right-hand motor imagery, left-hand motor imagery, right-foot motor imagery, mental calculation, internal word generation, and visual imagery) were chosen as target tasks. The tasks were performed by three healthy volunteers. A T2* weighted EPI sequence was used to obtain functional images. Feature vectors necessary for classification, were automatically extracted from the six thoughts tasks' regions-of-interest (ROIs). The ROIs was delineated from the activation regions that were consistently and exclusively activated during the training phase. Extracted feature vectors with activations were classified using the support vector machine (SVM) algorithm, which demonstrates a good generalization performance. With parameter optimization, the system successfully recognized the six different categories of the given thought tasks with above 90% accuracy using as short as 30-second of data acquisition for one participant. This participant performed tasks with six possible onset times for each task, as separate sessions. Independent component analysis (ICA) was also applied for unsupervised extraction of the temporal features of six different onset times with above 80% accuracy. The proposed automated spatio-temporal processing method of fMRI can be utilized for the further investigation of monitoring/identifying of human minds and their possible link to the hardware/computer control.

Keywords: functional magnetic resonance imaging, imagery task, brain computer interface, support vector machine, independent component analysis

Description of purpose: The real-time monitoring and identification of human thoughts hold many potential applications within the rehabilitation of stroke patients, brain-computer interface (BCI), and the electronic entertainment industry. Among present neuroimaging techniques, fMRI reproducibly detects dynamic neuronal activity changes in the human brain with superior spatial resolution. Recently, there has been growing interest in pattern classification and application of fMRI data [Cox and Savoy (2003), Martinez-Ramon et al. (2006), Yoo et al. (2004)]. These works, however, have been based on the detection of BOLD signal from the block-based paradigm that lacks the flexibility for efficient data/task utilization. In this present work, we propose a novel method for the automated classification of human thought expressed during cognitive trials using an event-design.

Methods: The study was approved by the local Institutional Review Board. Three healthy volunteers (21 to 35 years old) were participated. Clinical 3T MR scanner (Signa VH, GE) with standard birdcage head coil for RF transmission/detection was used. A T2* weighted EPI sequence was applied to detect blood-oxygenation-level-dependent (BOLD) neural signals. Based on preliminary experience, six distinct thoughts (right-hand motor imagery, left-hand motor imagery, right-foot motor imagery, mental calculation, internal word generation, and visual imagery) were selected as candidate imagery tasks to be used in a one-minute long event-related paradigm design with a 5-second task period. In order to examine the minimum amount of data necessary for the accurate classification, the number of volume acquisitions were divided into 20, 30, 40, and 50 volume scans (this also correspond to seconds due to TR=1s). The region-of-interest (ROI) for a specific task was automatically determined as the inter-task exclusive, intra-task overlapped
activation region (via cross-correlation analysis) during the 4 sessions in training set, and finally, the union of six ROIs (from six tasks) was used as an actual spatial mask for feature vector extraction from the activation map. Extracted feature vectors were classified using a support vector machine (SVM), which demonstrates good generalization performance. For the implementation of the SVM algorithm in our semi-real-time fMRI processing environment [Yoo et al., 2004], LIBSVM library was used

R provided robust task-specific feature vectors for each of the six imagery tasks. For reliable classification results, 30 sets of randomly chosen training (4 sessions) and testing (3 sessions) data for each task were considered. Figure 2 shows the classification results (mean±standard error) for three participants. Through cross-validation as an optimization method [Goutte, 1997], the given SVM algorithm successfully classified 18 sessions of imagery tasks from the test set with above 90% averaged accuracy for even 30-second paradigms for the participant-C (Figure 2). Using a similar method, the accuracy was5040302050403020504030205060708090Participant-CParticipant-BParticipant-AHit Rate (%)Acquisition Time (seconds) Mean
b component analysis (ICA) was also applied to unsupervtime series with six possible onsets timing data from participat above 80% accuracy by performing cross-correlation function (provided by SPM2). **Conclusions**: We have demonstrated the successful classfrom less than one minute worth of data acquisition usincrease the classification accuracy by finding more precicomponent analysis can be gainfully utilized for the nohemodynamic response function. The proposed spatio-tcrucial technical advancement for the automated interpretcomputer-interface system.

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10.30 AM *Intersession*

10.35 – 11.15 AM NON INVASIVE LESIONNAL TECHNOLOGIES

Chairman : De Salles A - Co-Chairman : Verrelle P

10.35 AM **MAPPING IN RADIOSURGERY** De Salles A (***UCLA, Los Angeles USA)***

10.55 AM **RADIOSURGERY WITH PROTON BEAMS** Schulte R (***Loma Linda USA)***

Department of Radiation Medicine, Loma Linda University Medical Center, Loma Linda, CA, USA

Proton radiosurgery has distinct advantages over other radiosurgery modalities such as Gamma Knife and linear accelerator (LINAC)-based radiosurgery. Protons have an inverted depth-dose profile with a dose (Bragg) peak at the end of the proton range, which can be adjusted with proton energy. Protons of the highest energy available in clinical facilities (250-270 MeV) have an exquisitely sharp lateral dose fall-off and are therefore suitable for functional radiosurgery. On the other hand, proton radiosurgery has its own challenges, including the high upfront costs of a clinical proton facility and the large size and weight of proton gantries, which makes additional measures necessary to achieve isocentric stability in the submillimeter range.

In this presentation, I will cover the range of proton radiosurgery techniques currently practiced at our institution and planned for the future. Technical solutions to challenges of proton radiosurgery will be addressed and new potential applications will be discussed.

11.15 AM COFFEE/TEA BREAK

11.25 – 12.45 AM NEUROMATHEMATICS

Chairman : Lemieux L - Co-Chairman : Boire JY

11.25 AM **KNOWLEDGE REPRESENTATION AND MODELIZATION OF BRAIN STRUCTURES**
Bloch I (***ENST, Paris France)***

Participants to this work: Elsa Angelini, Jamal Atif, Benedicte Batrancourt, Olivier Colliot,Celine Hudelot, Hassan Khotanlou, Olivier Nempont.

Ecole Nationale Superieure des Telecommunications, GET - Telecom Paris CNRS UMR 5141 LTCI - Signal and Image Processing Department 46 rue Barrault, 75013 Paris, France - Isabelle.Bloch@enst.fr

Keywords: anatomical knowledge, graphs, fuzzy sets, spatial relations, segmentation, recognition, spatial reasoning, brain imaging.

This talk presents recent work carried out at ENST related to brain imaging. We address the problem of segmenting and recognizing internal brain structures in MRI data, in both normal and pathological cases. The main focus of our current developments deals with the modeling of spatial organization of these structures. Existing descriptions of anatomical knowledge are mainly of linguistic nature. They involve a long list of linguistic terms corresponding to spatial relations between structures, which are routinely used by medical experts to visually interpret brain images. Recent works look at more formalized descriptions, based in particular on ontolo-gies. However there is still a need for knowledge representation and modeling frameworks that allow translating anatomical knowledge into a computational and operational tool for image segmentation and recognition. Our original contributions to this domain include:

- developing mathematical models of spatial relations, in the framework of fuzzy sets, accounting for their intrinsic imprecision;
- developing graph-based representations of knowledge, where vertices represent anatomical structures and edges spatial relations between them;
- instantiating the generic graphs with individual information extracted from the images;
- enriching ontologies with spatial relations and their fuzzy representations, which are then used to guide the spatial reasoning processes in the image;
- proposing new methodologies for brain structure segmentation and recognition based on these representations, using either graph matching in a global approach, or deformable models that integrate spatial relations in a sequential approach;
- dealing with pathological cases via segmentation of brain tumors, classification into a few categories, and joint adaptation of a generic graph and the reasoning process, coping with the variability of spatial relations depending on the tumor type.

Details can be found in our recent publications.

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11.45 AM **IMAGE POST-PROCESSING AND BRAIN IMAGING**
Boire JY (***Auvergne University, Clermont-Ferrand France)***

12.05 AM **SPATIAL NORMALISATION OF LESIONED BRAINS** Crinion J (***University College, London UK)***

12.25 AM **COUPLING EEG-FMRI** Lemieux L ***(University of London, London UK)***

EEG-correlated fMRI & the Study of Spontaneous Brain Activity: Epilepsy" Epilepsy is a condition characterized by abnormal electrical activity that can give rise to seizures. Localizing the generators of this activity is of primary importance in patients with severe, drug-resistant epilepsy who may be considered for surgical treatment. We have devised and perfected an advanced functional imaging technique that combines electroencephalography

(EEG) and Functional Magnetic Resonance Imaging (fMRI), which are complementary ways of measuring brain activity. The combined technique, called EEG-correlated fMRI allows us for the first time to observe localized haemodynamic changes linked to individual EEG

discharges, such as epileptic spikes. Using this tool, we have been able to obtain novel localizing information in a significant proportion of cases studied. EEG-correlated fMRI is emerging as an important new tool for the investigation of spontaneous brain activity, such as epileptiform EEG discharges. Although the results are promising in the context of eventual clinical application, sensitivity remains limited and some of the haemodynamic changes do not correspond to our expectation. New fMRI analysis methods are being developed which aim at increasing the technique's sensitivity while enabling us to reveal effects linked to various types of EEG abnormality.

12.45 AM *Pause*

12.50 AM LUNCH BREAK

1.35 PM *Pause*

1.40 – 3.00 PM CELL IMAGING
Chairman : Bearer EL - Co-Chairman : Shapiro E

1.40 PM **IN VIVO AXONAL TRANSPORT** Bearer EL ***(Brown University, Providence USA)***

2.00 PM **MR IMAGING OF US(M)PIO-LABELED CELLS USING INNER VOLUME 3-D FSE SEQUENCE**
Yoo SS ***(Harvard Medical School, Boston USA)***

2.20 PM **MRI-GUIDED CELL THERAPY** Bulte J ***(Johns Hopkins, Baltimore USA)***

2:40 PM **STEM CELL IMAGING** Shapiro E ***(Yale University School of Medicine New Haven USA)***

Cell tracking using magnetic resonance imaging is rapidly moving towards in vivo single cell detection. This has largely been facilitated by improved efficiency of contrast agent uptake, as well as optimized pulse sequences. Micron sized iron oxide particles (MPIOs) are emerging as a robust contrast agent for cell tracking. In contrast to the more commonly used nano-sized dextran coated particles, MPIOs have very high amounts of iron, as high as 90% iron and from 0.1 to 10 pg iron per particle, and are non-biodegradable, which extends the observable temporal window. Indeed, single MPIOs are detectable by MRI in cells in culture and in mouse embryos.
Today's talk will focus on in vivo cell labeling of neural stem cells and MRI detection of neural precursor migration from the subventricular zone (SVZ) to the olfactory bulb (OB). The SVZ is a neurogenic center in the rodent brain. Here, neural stem cells lining the lateral cerebral ventricles produce neural progenitors which migrate within the rostral migratory stream exclusively to the OB. The non-invasive imaging of this migration was made possible by directly labeling the stem cells in the SVZ by injection of MPIOs into the ventricle. Iron oxide particles disturb the homogenous magnetic field in the vicinity of the particles, creating dark contrast in susceptibility weighted imaging schemes. Once particles are endocytosed by the neural stem cells, through asymmetric cell division, the particles are transferred to the daughter neural progenitors and carried along during their migration. This is the first demonstration of in vivo cell labeling of any cell other than blood born cells and the first observation of endogenous stem cell migration by MRI.

3.00 PM *Intersession*

3.05 – 4.35 PM SURGERY 1
Chairman : Kikinis R - Co-Chairman : Soler L

3.05 PM **SIMULATION AND VIRTUAL REALITY, TOWARD NEUROSCIENCES APPLICATIONS**
Soler L ***(IRCAD, Strasbourg France)***

3.25 PM **OPEN SOURCE SOFTWARE FOR IMAGE GUIDED THERAPY**
Kikinis R ***(Harvard Medical School, Boston USA)***
Surgical Planning Laboratory - Radiology; ASBI, L1-050 - Brigham & Women's Hospital - 75 Francis St.- Boston, MA 02115-
Kikinis@bwh.harvard.edu

Free Open Source Software (FOSS) can potentially change the way that research is performed in image-guided therapy (IGT). Currently there is very limited interaction between FDA approved commercial software that in clinical routine use and non-FDA approved research software used for clinical research. A large scale FOSS effort that has the potential to bridge this gap has been adopted by the National Alliance for Medical Image Computing (NAMIC), funded by the National Institutes of Health through the NIH Roadmap for Medical Research, Grant U54 EB005149. This effort has been adopted and extended for IGT by the National Center for Image Guided Therapy (NCIGT) funded by the NIH Biomedical Technology Resource Center Grant U41 RR019703. In order for FOSS to maximally impact clinical research, it needs to co-exist and be inter-operable with FDA approved commercial software and devices. Such integration requires the development of well-characterized open interfaces to these proprietary devices and software environments. As part of this effort by NA-MIC and NCIGT, tools and methodologies have been developed that allow for quality assurance and performance characterization, and packaged into what is called the "NA-MIC Kit". Facilities provided by the FOSS NA-MIC kit, for instance, allow

scientists to share research infrastructure such as file readers, visualization modules and interfaces to devices such as trackers, image acquisition scanners and robots. Opentracker is an example of software with an open interface that works with several proprietary tracking systems and an active effort is underway in NCIGT to integrate it with the NA-MIC kit and enable IGT researchers to work at the same time with equipment from different vendors.

Last but not least, the "openness" of software is tied in closely with the software license that governs it. The NA-MIC FOSS effort has adopted a BSD style open source license for its infrastructure software. This open source license allows commercial entities to build on this platform and to create value-add versions of the software for commercial use.

3.45 PM **OPEN ARCHITECTURE SYSTEM AND SOFTWARE FOR IMAGE GUIDED THERAPY**
Hata N ***(Harvard Medical School, Boston USA)***
Brigham and Women's Hospital and Harvard Medical School
Image-guided surgery is promising method of cure to achieve minimal trauma, fast patient recovery, and reduction of clinical cost. Images used for navigation can be either pre-operative diagnostic images and/or intra-operative images. We have also observed the prevalence of surgical robot in clinics in the past decade giving an impact on medical care.
The aim of this presentation is to discuss the new dimension of minimally invasive surgery we can explore by integrating intra-operative imaging and surgical robot. The robot presented in my talk can compensate for the motion of the organs and guide the precision surgery by using *intra-operative* images as a digital map for robot control, without which we cannot perform image-guided intervention of dynamically moving organs.
The need for Image-guided robotics is further highlighted in our long-term clinical goal in the Brigham and Women's Hospital, to perform therapies in contemporary high-field, closed-bore MRI scanners, 3D Ultrasound, CT, and/or PET/CT that provide better delineation of disease lesion, and that becoming to be prevalent in hospitals and clinics worldwide. I will present our pilot studies from MR-guided ablation and needle therapies where we studied tissue-needle interaction, biomechanical modeling of tissue deformation, and merit of needle guidance by a MR-compatible robot. Those studies will eventually migrated into our motion control method of a close-bore MRI-compatible robot that drives therapy needles toward the targets under intra-operative image guidance and control.

4.05 PM **SURGICAL SIMULATION, VIRTUAL NEUROSURGERY**
Vloeberghs M ***(Nottingham University Hospital, Nottingham UK)***

4.20 PM **DESIGN OF AN INNOVATING ROBOTIC SYSTEM FOR NEUROSURGERY**
Alric M ***(Blaise Pascal University, Clermont-Ferrand France)***

4.35 PM *Intersession*

4.40 – 5.00 PM RELATED: SCIENTIFIC DISCLOSURE
4.40 PM **NEUROSCIENTIFC DISCLOSURE** Potdevin T ***(Agence France Presse - AFP, Paris France)***

5.00 PM END OF SESSIONS

5.05 PM Transfer
5.35 – 6.35 PM ROMAN ART TOUR IN THE CITY
7.15 – 8.30 PM CITY HOUSE RECEPTION

THURSDAY SEPTEMBER 7, 2006

8.30 – 9.30 AM ENDOSCOPIC SURGERY
Chairman : Decq P - Co-Chairman : Szekely G

8.30 AM **ENDOSCOPY AND HYDROCEPAHLUS: LESSONS FOR THE FUTURE**
Decq P (***Créteil, Paris France)***

8.50 AM **NEUROENDOSCOPY : CURRENT TOPICS, TOOLS AND TECHNIQUES**
Ishihara S (***Saitama Medical University, Saitama Japan)***
Department of Neurosurgery, Saitama Medical University, Japan - Address: 38 Morohongo, Moroyama, Irumagun, Saitama, 350-0495, Japan - Tel: +81 49 276 1334 - Fax: +81 49 294 4955 - E-mail: shopar72@saitama-med.ac.jp
With recent advances of optical technology, neuroendoscopic surgery has become more popular in recent years. Not only obstructive hydrocephalus, but also various pathological conditions are now thought to be good candidates for endoscopic treatment. This paper will cover following topics.
1) Neuroendoscopic treatable normal pressure hydrocephalus (NPH)

Normal pressure hydrocephalus has been a long-term concern in clinical field. Determination of indication for shunt surgery still remains controversy. Endoscopic intervention for this pathology has been reported recently. We now report one clinical entity which present the good possibility of treatment for NPH by neuroendoscope.

2) Endoscopic removal of intracranial hematoma.
Endoscopic evacuation of intracranial hematoma will be presented. This covers specially designed sheath, technique and pitfalls.

3) Newly developed coagulation tool for neuroendoscopic surgery.
Hemorrhage has been one major complications of neuroendoscopic surgery, especially in CSF. We developed a new coagulation device for neuroendoscope. This paper will demonstrate the mechanism of hemostasis by this tool and live video clip from surgical situation. This device is extremely useful in neuroendoscopic procedure for control of bleeding in CSF.

4) Recent neurovideoscope in Japan.
We have recently started to use a new Videoscope in Japan. This videoscope was particularly developed for neurointervention. Images and features of this scope will be presented.

9.10 AM **POTENTIAL OF IMAGE AND VR GUIDANCE TECHNIQUES IN NEUROENDOSCOPIC SURGERY**
Szekely G ***(Swiss Federal Institute of Technology, Zurich Switzerland)***

Gabor Szekely(1), Raimundo Sierra(2), Simon DiMaio(2), Daniel Bachowen(3), Ron Kikinis(2), Nobuhiko Hata (2), Ferenc Jolesz(2) (1) Computer Vision Laboratory, ETH Zurich (2) Surgical Planning Laboratory, Brigham & Women's Hospital, Boston (3) University of Applied Sciences, Winterthur

Virtual reality based simulation of medical procedures has become a rapidly growing research area during the past decade. A large number of academic and commercial systems have been developed, offering the possibility for training and planning procedures for a very wide spectrum of applications. Disturbingly, the related technology followed up to now two separate, independent lines of development. On one side, simulator systems have been created for skill training, relying on solutions allowing real-time response while taking only very limited responsibility for the validity of the feedback for a specific clinical case. On the other side, highly sophisticated strictly patient-specific surgical planning methods have been proposed which, however, rely on idealized, symbolic steps and do not allow the realistic execution of an intervention. Such systems have recently been augmented with navigation methods in order to ensure the possibly precise implementation of the pre-operative plan. With increasing computational power and substantial improvement in the quality of neuroradiological imaging, the highly desirable convergence of these two development lines is today within reach. The talk will describe the components of the individual systems and the status of a current project between the Surgical Planning Laboratory in Boston and the Computer Vision Laboratory in Zurich for their integration towards a unified support system. This allows individual interventional planning, training of the actual intervention in advance and optimal implementation in the operating room using navigation techniques.

9.30 AM *Intersession*

9.35 – 10.35 AM SURGERY 2

Chairman : Jolesz F - Co-Chairman : Cinquin P

9.35 AM **FUTURE TRENDS IN NEUROSURGICAL OR** Jolesz F ***(Harvard, Boston USA)***

9.55 AM **CHALLENGES IN COMPUTER ASSISTED MEDICAL INTERVENTIONS**
Cinquin P ***(TIMC-IMAG-CNRS, Grenoble France)***

10.15 AM **REMOTE CONTROLLED SURGICAL SYSTEM** Desgeorges M ***(Invalides, Paris France)***

10.35 AM COFFEE/TEA BREAK

10.50 – 11.50 AM SURGERY 3

Chairman : Deveaux B - Co-Chairman : Moreau JJ

10.50 AM **BRAIN MAPPING IN EPILEPTIC SURGERY** Deveaux B ***(Hôpital Saint-Anne, Paris France)***

11.10 AM **BRAIN MAPPING IN STEREOTACTIC SURGERY**
Lemaire JJ ***(Auvergne University, Clermont-Ferrand France)***

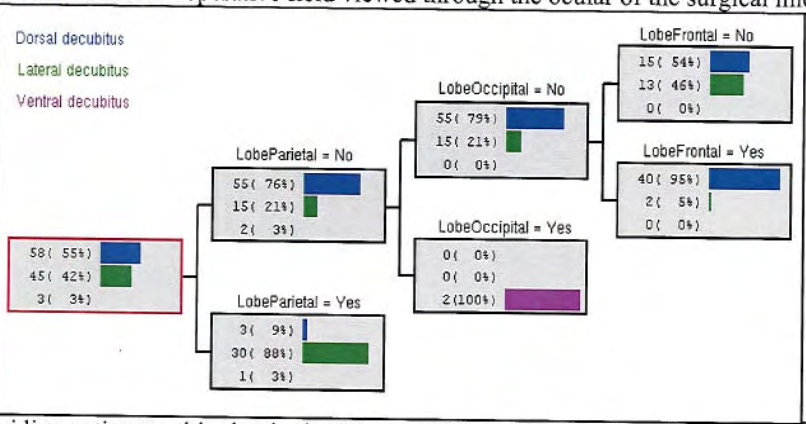
11.30 AM **MODELS OF SURGICAL PROCEDURES IN COMPUTER ASSISTED NEUROSURGERY**
Jannin P ***(Medecine Faculty, Rennes France)***

Keywords : multimodal image guided neurosurgery, surgical models, surgical ontology

The objective of this presentation is to suggest the improvement of information, involved in the surgical process, by translating implicit knowledge into explicit one. Making information explicit goes through the construction of models. In the last 15 years, a lot has been done for building numerical patient model from multimodal pre operative images. Image segmentation and registration methods allow defining surgical target(s), some reference areas, areas to be avoided, and trajectories from these images. This model can be displayed in the operating room along with the real patient, thanks to augmented reality and updated by using intra operative images (e.g., 3D US, video images). Image guided surgery made information about the patient more explicit, but lot of information still remains implicit, especially regarding the surgical practice. The high inter patient and inter surgeon variability in neurosurgery has to be studied and modelled for its

explicit understanding. We will demonstrate that surgical models are an appropriate solution. We will suggest a global methodology for surgical models including the definition of a surgical ontology, the development of software for surgical experience description based on this ontology, and the analysis of these descriptions for knowledge generation about the surgical practice. This approach will be illustrated in the context of analyzing the relationships between the tumour localization in a lobe and the patient positioning in the OR for a population of 200 surgical cases. Additional examples will outline other facets of surgery which can be addressed. Finally, we will outline some issues related to this approach and emphasize the need for inter disciplinarity and standards in this domain.

Augmented virtuality displaying the preoperative patient model with anatomo-functional information along with the 3D surface of the operative field viewed through the ocular of the surgical microscope



Decision tree providing patient positioning in the OR according to the tumor localization in a population of 200 surgical cases

11.50 AM *Intersession*

11.55 – 12.15 AM RELATED: ETHICS

11.55 AM **NEUROETHICS** SICARD D *(President of French National Committee of Ethics, Paris France)*

12.15 AM *Pause*

12.20 AM LUNCH BREAK

1.10 PM *Pause*

1.20 – 2.15 PM SURGERY 4

Chairman : Massoudi F - Co-Chairman : Lemaire JJ

1.20 PM **FRAMELESS STEREOTAXY** Massoudi F *(UCLA, Los Angeles USA)*

1.40 PM **MULTI-MODALITY BRAIN MAPPING FOR PRE- AND INTRA-OPERATIVE IMAGE-GUIDED NEUROSURGERY** Golby AJ *(Harvard Medical School, Boston USA)*

Ongoing advances in image-guidance and functional brain mapping techniques have the potential to improve the neurosurgical treatment of patients with brain tumors and other lesions in critical cortical areas. Maximal surgical resection is the best initial treatment for most

brain tumors. However, operating on tumors located in critical areas, such as language areas, poses a risk of significant neurologic deficit to the patient. Recent technological advances have led to the development of several non-invasive functional brain imaging modalities including functional Magnetic Resonance Imaging (fMRI), Magnetoencephalography (MEG), and Diffusion Tensor imaging (DTI). These techniques are promising modalities for the determination of individual patient functional brain anatomy. Combining these modalities may provide complementary information benefiting from strengths of each technique and minimizing weaknesses. Data from various functional mapping studies may be co-registered with anatomic data and integrated into the intra-operative navigation system thereby providing the surgeon with an intra-operative functional map. The use of intra-operative MRI and non-rigid registration can account for brain shift that occurs during surgery and thereby improve the spatial accuracy by updating the images. The use of multi-modality brain mapping intraoperatively is an exciting development although there are many issues remaining to be studied including the impact on extent of resection and patient neurologic outcome. We discuss issues related to the choice of behavioral paradigms, display of complex data sets, segmentation, coregistration, computational modeling of brain shift, and integration between functional modalities.

2.00 PM **WORLD FIRST HYBRID INTERVENTIONAL PROCEDURE SUITE; MRI/X-RAY/OPERATION SUITE (MRXO)** Matsumae M ***(Tokai University School of Medicine, Kanagawa Japan)***

2.15 PM **RECONSTRUCTION OF CRANIO-FACIAL BONE DEFECTS USING BIOCERAMIC IMPLANTS MANUFACTURED BY A STEREOLITHOGRAPHIC PROCESS**Brie J ***(Limoges University, France)***

2.30 PM *Intersession*

2.35 – 4.10 PM TUMOR

Chairman : Menei Ph - Co-Chairman : Chazal J

2.35 PM **INTRAOPERATIVE BIOPHOTONICS** Akimoto J ***(Tokyo Medical University, Tokyo Japan)***

2.55 PM **FLUORESCENCE BASED RESECTION OF GLIOMAS**
Sabel ***(University of Erlangen-Nürnberg, Erlangen Germany)***

3.15 PM **INTRAOPERATIVE OPTICAL IMAGING** Prakash N ***(UCLA, Los Angeles USA)***
Optical imaging of intrinsic signals (OIS) is a research functional brain mapping technique that has microscopic resolution. The signals that it measures are nearly identical to those measured with functional magnetic resonance imaging. OIS is has become more developed across multiple academic centers for intraoperative functional brain mapping . The findings of currently published optical imaging studies in humans will be reviewed and compared to other human functional brain imaging studies. Newer techniques based on OIS being developed for research or intraoperative use will also be discussed, such as 2D- and 3D-optical spectroscopy, optical doppler tomography, and optical biopsy.

3.35 PM **IN SITU CHEMOTHERAPY FOR GLIOMAS: FROM POLYMERIC DEVICES TO NANOTECHNLOGIES**
Menei Ph ***(University Hospital, Angers France)***

3.55 PM **ADVANCED MRI TECHNIQUES FOR PRE AND INTRA-OPERATIVE EVALUATION OF BRAIN TUMORS**
Armin SS ***(Loma Linda University Medical Center, Loma Linda USA)***
Sean S. Armin, Barbara Holshouser, Karen Tong, Ravi Raghavan, Frank P.K. Hsu
Departments of Neurosurgery, Radiology, and Pathology and Laboratory Medicine, Loma Linda University Medical Center

MRI techniques have been an integral part of pre-operative and intra-operative evaluation for brain tumor resections. MR stereotaxy allows anatomical definition of lesions in the brain allowing safe resection of tumors. However, the full potential of MR techniques has not been fully realized. Recent advances of MR techniques are allowing us to refine our understanding of tumor physiology and characteristics. Perfusion MR combined with MR spectroscopy (MRS) can provide information about regional vascularity differences as well as local metabolite characteristics and can thereby detect areas of occult tumor extension, distinguish between tumor recurrence and radiation necrosis, identify certain tumor histological subtypes, and determine tissue areas of optimal quality for biopsy. Diffusion tensor imaging (DTI) which studies the cytoarchitecture of brain cells and interstitial tissues can differentiate between intact white matter displaced by tumor or edema and white matter infiltrated by tumor, thus allowing for more precise tumor resection and avoidance of eloquent brain areas. Even newer MR techniques such as oxygen extraction assessment may provide information about local metabolic activity similar to that offered by PET at a fraction of time and resources, while helping us derive a grading system that has only been available by pathological means. We will review how by combining these various advanced MRI modalities with conventional contrast enhanced MR imaging, metabolic and physiologic data can complement the anatomic information enabling us to devise an algorithm to refine our approach to brain tumor treatment. We will present preliminary data on tumor patients treated at Loma Linda University Medical Center where they have each been evaluated preoperatively with MRS, DTI, perfusion and oxygen extraction studies in addition to conventional MR imaging to enhance tumor characterization and surgical resection.
Keywords: MRI brain tumor resection, spectroscopy, diffusion tensor imaging, perfusion, oxygen extraction
Preferred Presentation Type: Oral

Description of purpose, Method(s), Results, New or breakthrough work to be presented, Conclusions: Please see abstract.
This work has not been presented or submitted for publication elsewhere.

4.10 PM COFFEE/TEA BREAK

4.30 PM END OF SESSIONS

4.35 PM *Transfer*

6.15 PM DEPARTURE FOR THE GALA DINNER – CASTLE

FRIDAY SEPTEMBER 8, 2006

8.30 – 9.30 AM BIOMECHANICS/TRAUMA
Chairman : Terminassian A - Co-Chairman : Chambers I

8.30 AM **INTRA CRANIAL BIOMECHANICS** Czosnika M (***University of Cambridge, Cambridge UK)***

8.50 AM **NON INVASIVE ASSESSMENT OF INTRACRANIAL BIOMECHANICS**
Ragauskas A (***Kaunas University of Technology, Kaunas Lithunia)***
Saules 39-10, LT- 51362 Kaunas, Lithuania - Tel.: +370 686 20084 - Fax: +370 37 736897 - e-mail: telematics@ktu.lt
Biomechanics / Trauma
The new ultrasonic methods are proposed for TBI monitoring. An absolute ICP (aICP) measurement method was designed which does not need calibration of the system "individual patient – non-invasive ICP meter". We compared this method with invasive aICP method in ICU on the TBI patients.
A new method is based on two-depth TCD technique for aICP and external absolute pressure aPe comparison using the eye artery (EA) as natural "scales". The intracranial segment of EA is compressed by aICP and the extracranial segment is compressed by aPe applied to the tissues surrounding the eye. The blood flow parameters in both EA segments are approximatelly the same when aPe = aICP. Two depth TCD device is used as an indicator of balance aPe = aICP when the pulsatility index of blood flow velocity waveform in intracranial and extracranial segments are the same. The results of simultaneous invasive and non-invasive aICP measurements show that the difference between such measurements is negligible (mean = 0.94 mmHg) with SD = 6.18 mmHg, i.e., it is possible to measure aICP non-invasively without calibration problem.
The new ultrasonic method is also proposed for non-invasive intracranial blood volume (IBV) slow, respiratory and pulse wave monitoring. The objective was to investigate a diagnostic value of non-invasively measured IBV pulse waves in different pathologies. A total of 57 patients and 53 healthy volunteers were examined. These included different hydrocephalus cases, spinal cord injury and terminal brain blood flow. The detectable change in non-invasively recorded IBV pulse wave form shape was observed when disturbance in intracranial hydrodynamics was present.
Keywords: non-invasive absolute ICP measurement

9.10 AM **IMAGING AND BRAIN TRAUMA** Terminassian A ***(University Hospital, Caen France)***

9.30 AM COFFEE/TEA BREAK

9.50 – 11.20 AM HAND-ON WORKSHOP

Presentation of Workshop
RADIOSURGICAL PLANNING De Salles A (***UCLA, Los Angeles USA)***

BASAL GANGLIA MAPPING Lemaire JJ (***Auvergne University, Clermont-Ferrand France)***

NEUROENDOSCOPY Decq P (***Créteil, Paris France)*** - Ishihara S (***Saitama Medical University, Saitama Japan)***

TELESURGERY Corporates

11.20 AM *Intersession*

11.30– 12.10 AM VASCULAR
Chairman : Picard L - Co-Chairman : Irthum B

11.30 AM **INTERVENTIONAL NEURORADIOLOGY AND/OR ENDOVASCULAR NEUROSURGERY?**

WHAT ABOUT THE FUTURE? Picard L *(University Hospital* **of** *Nancy, Nancy France)*

11.50 PM **NEAR-INFRARED ANGIOGRAPHY FOR ANEURYSM SURGERY**
Raabe A *(Johann Wolfgang Goethe University, Frankfurt am Main Germany)*

12.10 PM *Pause*

12.15 PM LUNCH BREAK

1.00 PM *Pause*

1.10 – 1.50 PM BIOMEDICAL INFORMATICS
Chairman : Erberich S - Co-Chairman : Boyer L

1.10 PM **GRID-BASED NETWORK FOR BRAIN MAPPING**
Erberich S *(USC, Los Angeles USA)*

Stephan G. Erberich, Manasee Bhandekar, Marvin D. Nelson, Ann Chervenak, Carl Kesselmann
Department of Radiology, Childrens Hospital Los Angeles, University of Southern California, Los Angeles, U.S.A.
Information Science Institute, University of Southern California, Los Angeles, U.S.A.

Purpose: Imaging modalities suitable for brain mapping, e.g. MRI or PET/CT, are becoming commonly available. However brain mapping requires (i) acquisition and storage of large brain volumetric data and (ii) post-processing of 3D/4D data sets. Both requirements are challenging for the typical patient care facility, but are available at specialized centers. Now the objective of this project is to enable patient care facilities to utilize expert centers for large data storage and image post-processing for brain mapping. Here we describe a solution using Computing and Data Grid technology based on the Globus Toolkit Open Grid Service Architecture (OGSA), an open-source distribution of the Globus Alliance.

Methods: We focus on the core components required for sharing brain mapping resources: (i) image handling, storage and access, (ii) image post-processing of large scale medical image data using fMRI as example modality. Image handling requires DICOM compatible communication between Modality-to-Grid storage and Grid-to-DisplayWorkstation. We use the DicomGridInterfaceService (DGIS) of the Globus Alliance MEDICUS proto-project to transfer images between a DICOM network and Grid domains. DGIS supports DICOM v3 C-ECHO, C-STORE, C-GET operations. Images are stored as compressed series records at an off-site archive within the Grid domain. In addition images are referenced in Meta Catalog Service using Globus Alliance OGSA-DAI service. The combination of catalog and storage allows PACS operations for store and query/retrieve operations from any participating institution. The second system we developed is an automatic Grid enabled processor (Grid funcLAB) for functional MRI (fMRI) data using SPM software as processing engine. When images are published via DGIS to the Grid, funcLAB automatically identifies fMRI images and task paradigms using DICOM image information. A Grid transfer is initiated to the next available funcLAB processor within the Grid and processing is executed. The resulting brain maps are stored as secondary capture DICOM in the grid storage. Any Grid participant can discover the processed images and query/retrieve the results to its local Display Workstation.

Results and Breakthrough work: Images could be send directly from any DICOM modality we tested: GE MRI, Philips High-Field MRI, Philips PET/CT, Siemens MRI, Siemens US, GE CT and Philips CT. We measured about 10-times speed increase using GridFTP transport protocol compared to DICOM transfer on the same network bandwidth between modality and storage. 30 sample fMRI cases with anatomical correlate have been send to the Grid storage. Grid funcLAB discovered and processed all 30 cases automatically. Average processing using a Quad 64Bit 2.2GHz Athlon Opteron System was measured at 6.3 minutes for typical clinical fMRI studies of 60 volumes, 64x64 matrix, 256x256 matrix T1 reference.

Conclusion: Grid computing and data technology enables medical facilities to communicate images efficiently and transparent for the user. This allows to utilize resources, either storage or processing services, available within the Grid community and opens novel brain mapping techniques to be in reach for any care facility. An additional benefit of Grid usage is that fMRI paradigms and post-processing is standardized which for the first time allows direct comparison of images from different institutions. Using standard open-source Globus Alliance Grid technology allows to built a robust IT infrastructure to share knowledge and thus enables true collaboration, not limited to brain mapping.

1.30 PM **COLLABORATIVE NETWORKS: THE FUSION OF DATA, STANDARDS AND GUIDELINES FOR IMPROVING MANAGEMENT** Chambers I *(New Castle UK)*

Contact details
Dr IR Chambers - Regional Medical Physics Department - Newcastle General Hospital - Newcastle upon Tyne - NE4 6BE UK.
Tel +44 191 2336161 Ext 22635 - Fax +44 191 2260970 - Email i.r.chambers@ncl.ac.uk

Introduction The lack of standards and methodology in clinical research can make comparisons of studies from different centers different. In addition there are situations where patient recruitment is likely to be low and therefore the time taken to complete studies may be unacceptably high. Networks are one way of standardizing methodology, improving patient recruitment without necessarily being prescriptive on the work of participants.

Methods The BrainIT network evolved from a multi-disciplinary group of researcher working in the field of head injury. The underlying ethos is one of openness & collaboration, anyone can join, it is a non-profit organisation and time is given voluntarily. All BrainIT studies contribute to a central database which contributing members have free access to for analysis and hypothesis testing.

Results To date 384 patients (381 with monitoring) have been recruited from 22 different centres. There are currently 207 validated cases in the database and analyses of the first 200 cases are ongoing. They include work on: the statistical features of blood pressure data, comparison of arterial pressure and simultaneous NIBP data and the diurnal variation of arterial and intracranial pressure. There are also planned studies on: the influence of sampling time, measuring secondary insults, surrogate markers and identifying difference in clinical management.

Conclusion Research networks can provide substantial benefits for clinical studies. They can standardise methodology, do things quicker, bring diverse groups together providing a larger intellectual mass. These have benefits not only for the researcher but also patients, the medical device industry and pharmaceutical companies. To be successful there is a substantial overhead to establish and maintain any network and this must be borne in mind. However the potential benefits for a successful network are substantial.

1.50 PM Intersession

1.55 PM CLOSING REMARKS
2.10 PM END OF CONGRESS

2.15 PM TRANSFER/AIRPORT TRANSPORTATION